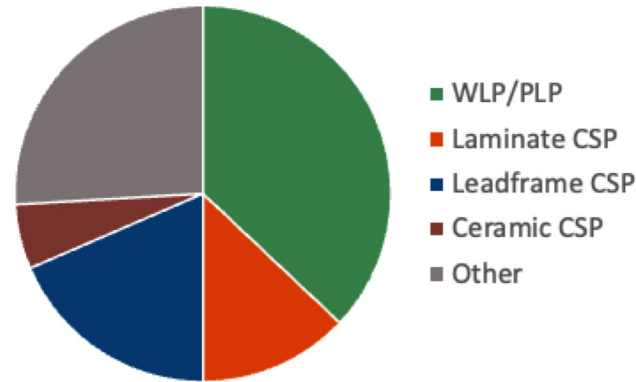


# Samsung Galaxy Watch6 (Wi-Fi + LTE)

Teardown from TechSearch International, Inc.



54 Packages Examined



## Contents and Highlights

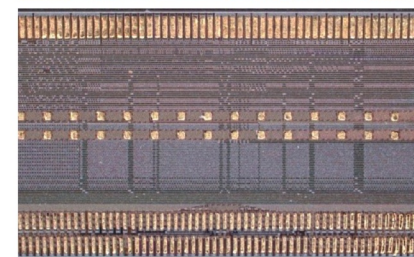
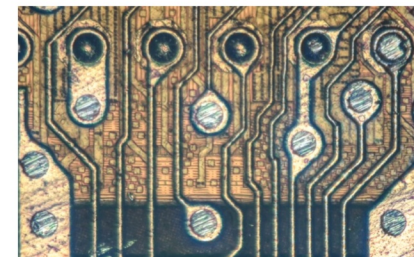
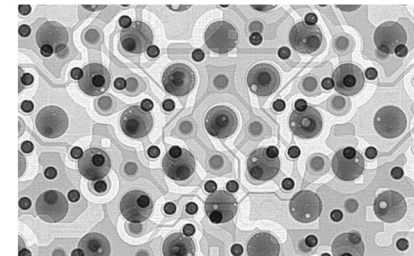
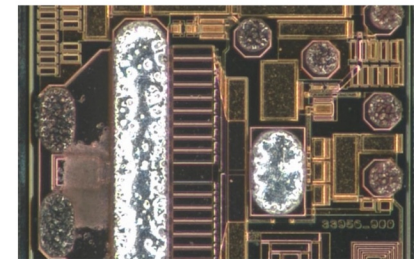
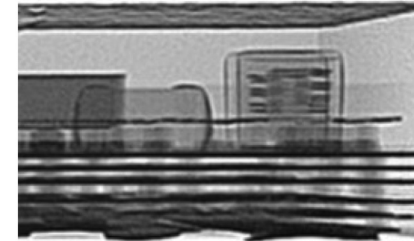
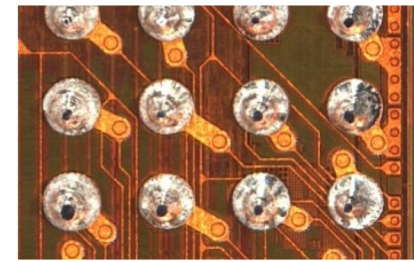
- 73-page report with package quantity summaries, high-resolution photos and x-rays, package dimensions, part numbers and descriptions
- 12 additional slides with extra details about the Samsung Exynos W930 mobile processor in a two-die fan-out PLP including RDL and die metrics, decapsulation of two new Qualcomm RF modules, new touchscreen controller from Zinitix, WLP-assembled ambient light sensor, and Synaptics display driver IC

## Teardowns backed by 37 years serving as the industry's trusted source for semiconductor packaging trend analysis

- Examination of all chips with emphasis on assembly and packaging technologies
- Superb quality photographs and x-ray images
- Both the packages and the die within are identified and characterized
- Detailed construction analysis of key chips and packages



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# Sample pages from the report and slides

### Samsung Galaxy Watch6 (Wi-Fi + LTE)

SM-R945U

category Wearable  
released Aug 2023



Package quantities (by package type)

WLP/PLP	
Laminate CSP	1
Leadframe CSP	
MIS CSP	
Ceramic CSP	
Other	
<b>TOTAL</b>	<b>54</b>

Die quantities (by die interconnect type)

RDL/WLP	
Flip chip	
Wire bond	
Clip	
Ribbon	
<b>TOTAL</b>	

Total area (mm<sup>2</sup>)

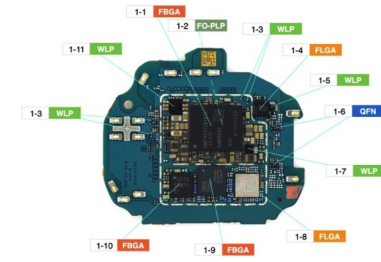
Bare die solutions	
Included	
Excluded	
<b>Package area</b>	

Package = Any device that has completed final packaging steps, includes all 4800 packaged devices as well as finished packages mounted inside other packages/modules. Counts includes not counted as packages or other packages/modules. Counts includes not counted as packages or other packages/modules. Bare die solutions = Finished devices received directly on boards or flex circuits (e.g., chip on board, chip on flex, chip on substrate, etc.)

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### Samsung Galaxy Watch6 (Wi-Fi + LTE)

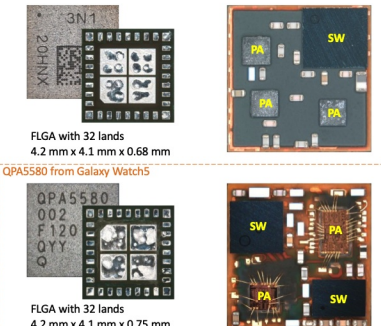
#### ASSEMBLY 1 — Main board side 1



1-1 FBGA  
1-2 FO-PLP  
1-3 WLP  
1-4 FLGA  
1-5 WLP  
1-6 QFN  
1-7 WLP  
1-8 FLGA  
1-9 FBGA  
1-10 FBGA  
1-11 WLP

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### Qualcomm QPA6590 PAM



FLGA with 32 lands  
4.2 mm x 4.1 mm x 0.68 mm

QPA5580 from Galaxy Watch5

FLGA with 32 lands  
4.2 mm x 4.1 mm x 0.75 mm

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### Samsung Galaxy Watch6 (Wi-Fi + LTE)

#### PACKAGE QUANTITY DETAILS

Board-level assembled packages	Board-level	Package-level
WLP/PLP		
Laminate CSP		
Leadframe CSP		
MIS CSP		
Ceramic CSP		
Bare die on board/flex		
Other		
<b>TOTAL</b>	<b>54</b>	

Package-level assembled packages	Board-level	Package-level
WLP/PLP		
Laminate CSP		
Leadframe CSP		
MIS CSP		
Ceramic CSP		
Other		
<b>TOTAL</b>	<b>54</b>	<b>0</b>

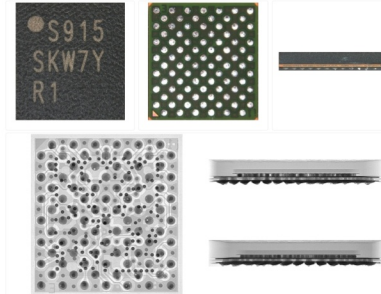
Board-level = Packaged devices mounted to boards, flex circuits, etc. during electronics assembly  
Package-level = Pre-packaged devices assembled inside other encapsulated packages or modules  
L = Laminate substrate; C = Ceramic substrate

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### Samsung Galaxy Watch6 (Wi-Fi + LTE)

#### ASSEMBLY 1 — Main board side 1

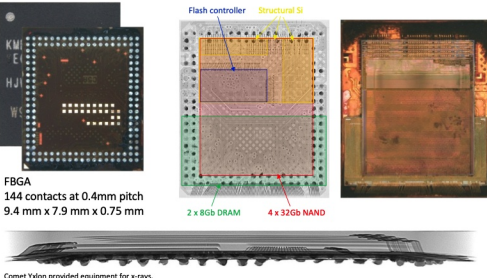
QTY	DESCRIPTION	PACKAGE SIZE	HEIGHT	PAD THICKNESS	FEATURES
1-10	Samsung Semiconductor RF transceiver	4.15 mm x 3.87 mm	0.6 mm	0.527 mm	91, 0.4 (0.50x0.56) mm
1-10	FBGA (Laminate CSP)				Flip chip



Comet Xylon provided equipment for x-rays

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### Samsung MCP (16Gb LPDDR4X + 16Gb eMMC Flash)



FBGA  
144 contacts at 0.4mm pitch  
9.4 mm x 7.9 mm x 0.75 mm

2 x 8Gb DRAM  
4 x 32Gb NAND

Part number KMDT60012M-A625  
4Gb more LPDDR4X DRAM than MCP from Galaxy Watch5

Comet Xylon provided equipment for x-rays.

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### Samsung Galaxy Watch6 (Wi-Fi + LTE)

#### PACKAGES BY SUPPLIER LOCATION

Supplier HQ	Count
China	3
Europe	
Japan	
Korea	
N America	
SE Asia	
Taiwan	
Other	
unknown	
<b>TOTAL</b>	<b>54</b>

#### PACKAGE AREA BY CHIP TYPE

Chip Type	Area (mm <sup>2</sup> )
Analog/Mixed-signal	23.5
RF analog	
Logic	
Memory	
Sensor-Actuator	
Image sensor	
Discrete	
OpAmp	
RF Passive	
IPD	
unknown	
<b>TOTAL</b>	

Geographic quantities based on headquarters location of chip suppliers; includes bare die solutions  
Measured width x length; includes bare die solutions

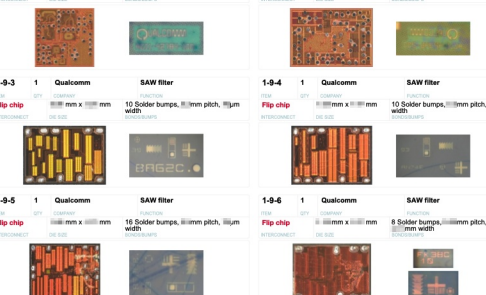
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### Samsung Galaxy Watch6 (Wi-Fi + LTE)

#### ASSEMBLY 1 — Main board side 1

##### Component Details Die count: 15

QTY	DESCRIPTION	PACKAGE SIZE	HEIGHT	PAD THICKNESS	FEATURES
1-9-1	Qualcomm RF LNA				
1-9-2	Qualcomm RF switch				
1-9-3	Qualcomm SAW filter				
1-9-4	Qualcomm SAW filter				
1-9-5	Qualcomm SAW filter				
1-9-6	Qualcomm SAW filter				



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### List of Packages

QTY	DESCRIPTION	PACKAGE SIZE	HEIGHT	PAD THICKNESS	FEATURES
1-1	Samsung Semiconductor KMDT60012M-A625 MCP (16Gb LPDDR4X + 16Gb eMMC NAND) Memory	9.39 x 7.87 x 0.76	144	0.4	1 Pad, Underfill, Wire bond, Stacked die
1-2	Samsung Semiconductor SE65193 Eyrusa W630 1.4GHz RF with 1.5E module and Logic				FO-PLP
1-3	ESD protection diode				Diacrete WLP
1-4	6-axis IMU				Sensor-Actuator FLGA
1-5	3-axis electronic compass				Sensor-Actuator WLP
1-6	Antenna switch (SP4T)				RF Analog QFN
1-7	RF APT-PMIC				Analog/Mix-Sig WLP
1-8	Qualcomm QPA6590 RF PAM (AG and 3G)				RF Analog FLGA
1-9	Qualcomm QPA6515 RF FEM (AG)				RF Analog FBGA
1-10	Samsung Semiconductor SSM9150 RF transceiver				RF Analog FBGA
1-11	Wireless power receiver				Analog/Mix-Sig WLP
2-1	Samsung Semiconductor S1M6550 Eyrusa RF 6550 WLP				RF Analog WLP
2-2	SAW filter				RF Passive CSP-C
2-3	LNA for GNSS				RF Analog SON
2-4	Dust SAW filter				RF Passive CSP-L
2-5	NFC controller				RF Analog WLP
2-6	ESD protection diode				Diacrete WLP
2-7	7A8LP1G332G DR gate				Logic SON
2-8	Zinlix ZTM730 Touchscreen controller				Logic WLP
2-9	Programmable DVS back controller				Analog/Mix-Sig WLP

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For pricing, please call +1-512-372-8887